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Associations between environmental value orientations and landscape preferences

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Abstract

Why do group differences in landscape assessment exist? In the present paper, we explore the hypothesis that landscape preferences are associated with people's environmental value orientations, operationalised according to Thompson and Barton's [J. Environ. Psychol. 14 (1994) 199] distinctions between anthropocentric, ecocentric, and apathetic orientations toward the environment. Preferences for local landscapes and environmental value orientations were surveyed in a sample of the adult population of Røros, southern Norway. The highest preference was expressed for wildland scenes containing water, followed by cultural landscapes and traditional farm environments. Landscapes with elements of modern agricultural practises were the least preferred category. Significant positive correlations were found between the ecocentric environmental value orientation and a preference for wildlands with water, and for cultural landscapes. The anthropocentric value orientation correlated positively with a preference for farm environments, while environmental apathy was negatively associated with a preference for wildlands and cultural landscapes. The respondents agreed to ecocentric, but were neutral to anthropocentric statements. The findings indicate that the majority of the people in the area should be responsive to ecocentric arguments when development and conservation plans are presented. © 2002 Elsevier Science B.V. All rights reserved.

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1. Introduction

During the last 25 years, a large number of studies of affective and aesthetic evaluation of landscapes have been published (see reviews by Zube et al., 1975; Kaplan and Kaplan, 1989; Bourassa, 1990). One consistent finding has been that people from various cultures prefer (like) natural environments better than built or otherwise human-influenced

environments, and that park- or savannah-like landscapes often receive the highest ratings (Ulrich, 1993). Human influence may be appreciated, however, provided that it is perceived as in balance with natural elements, like in nature scenes containing old structures like stone walls or stone bridges (Strumse, 1994). In combination with findings which show that natural scenes contribute to restoration from stress (Ulrich et al., 1991), these studies have been interpreted as supporting an evolutionary theory of human landscape preferences. Several researchers have concluded that similarities in evaluations of natural scenes far outweigh the differences across cultures or smaller groups (Ulrich, 1993).

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However, ever since Darwin, it has been recognised that genetic variation is one central part of evolution, and that such variation may facilitate adaptation to various or changing environments. Thus, individual and inter-group differences in environmental preferences are also expected within an evolutionary framework, in addition to the similarities referred to above. Accordingly, both cultural and genetic factors may contribute to evaluative responses to environmental types (Bourassa, 1990; Hartig, 1993). It has been shown that landscape preferences may change with age (Balling and Falk, 1982; Lyons, 1983; Zube et al., 1983), and that they may differ across demographic groups (Gonzalez-Bernaldez and Parra, 1979). More recently, Yu (1995) showed that living environment (urban versus rural), education level, and occupational interests influence landscape preferences of Chinese respondents. And in a Dutch study (van den Berg et al., 1998) farmers' beauty ratings of various landscapes differed from the ratings of visitors and non-farming residents. In addition to differences across socio-demographic groups, individual personality traits may be related to landscape preferences. Zuckermann et al. (1993) found that the sensation-seeking trait was related to a relatively positive response to risk-evoking landscapes.

Our affective or aesthetic evaluation of landscapes is not an isolated mental process; it must instead necessarily be associated with additional and related affective and cognitive constructions that we have regarding our relationship with both society and our physical surroundings. According to social adaptation theory (Homer and Kahle, 1988), our general values are one type of cognitions that facilitate adaptation to the environment. Values have been defined as general and important life goals or standards which serve as guiding principles in our lives (Rokeach, 1973), and they are thought to determine attitudes and behaviour toward specific aspects of our environment. In addition to these general values, we may have values oriented toward a more restricted part of the environment, called basic beliefs or value orientations (Fulton et al., 1996). For example, most people evaluate environmental issues, thereby expressing their environmental value orientation. Attempts to measure aspects of environmental value orientations were made by Dunlap and Van Liere (1978) and Dunlap et al. (1992). Their instrument (The New

Environmental (Ecological) Paradigm Scale, NEP) has been widely used. Stern and Dietz (1994) distinguished between the egoistic value orientation (environmental problems may harm the individual), the social-altruistic value orientation (problems may harm other people), and the biocentric value orientation (nature has intrinsic rights, independent of human interests). Thompson and Barton (1994) proposed that the social-altruistic and the egoistic value orientations both are expressions of human interests in avoiding damage to the environment, thus, the two types of orientations were regarded as one type, named the anthropocentric attitude. They recognised the biocentric value orientation proposed by Stern and Dietz (1994) and named it the ecocentric attitude type. Thus, two different motives or reasons for people's environmental concern may be identified (in addition to environmental apathy, which was not further studied by Thompson and Barton (1994)).

The concept of attitude is used about people's tendency to respond favourably or unfavourably toward a class of objects or events. These classes may be more or less specific, however. The environmental value orientations measured by the researchers cited above are of a rather general nature (although called attitudes by some of the researchers), and are postulated (Homer and Kahle, 1988; Fulton et al., 1996) to influence more specific attitudes, like attitudes toward foreigners, wildlife, noise or even landscapes.

Returning to the study of landscape preferences, we can now draw a parallel to the study of environmental value orientations and attitudes. Many people may express a preference for specific landscapes, but for very different reasons. Some people may want to protect a landscape because it serves human utilitarian needs, while others may emphasise ecocentric values. For example, a productive river or a forest landscape may be preferred either because they may be harvested and thus, satisfy human needs (an anthropocentric motive), or because they have intrinsic value as an ecosystem (an ecocentric motive). Also, when individual or inter-group differences in landscape appraisals are found, they may be closely related to underlying differences in values and attitudes toward environmental issues. For example, when Chinese farmers responded negatively to water dominated and misty rocky scenes (Yu, 1995), and Dutch farmers were

relatively negative to development plans involving wetness and non-cultivatedness (van den Berg et al., 1998), part of the explanation may be farmers' relatively anthropocentric attitudes. These topics are salient both from a theoretical and land use management perspective. In a more overall sense, the issue centres on the question of the diverse meanings attributed to the landscape (Williams, 1995; Williams et al., 1992). Expanding the perspective from considerations of the functional capabilities of the landscape to values and socio-cultural meanings is probably one of the paramount challenges of future land use planning.

In this study, we analyse potential associations between environmental value orientations and landscape preferences in a study of how inhabitants of the Røros area in central Norway evaluated scenes from their own region. The research questions are:

- Can patterns of landscape preferences be identified in terms of how attractive certain landscape images are perceived to be?
- Can relationships between landscape preferences and environmental value orientations be identified?
- Do socio-demographic conditions have any significant effect on the relationship between landscape preferences and environmental value orientations?

2. Methods

2.1. Study area and sample

This study is part of a project examining perceptions and evaluations of agricultural landscapes in Norway. The study area comprises the municipality of Røros in southern Norway, a sparsely populated mountain region with a mix of forests and mountains, agricultural lands and fairly small settlements. The population of the municipality is approximately 5000 persons with the majority living in the historical mining town of Røros. The town is now a World Heritage site due to the history of 350 years of copper mining resulting in a rather unique land use system and interaction between resource use and landscape change, as well as a multitude of well preserved buildings of great cultural value. Now the mines are no longer in operation and the community have over the past three decades relied on a combination of

tourism, agriculture, and being a public service centre. Mining, agriculture, and extensive use of backcountry resources like hunting, fishing and forestry have been intertwined for centuries and produced a stable mixed economy. Currently, the local community, as well as national interest groups debate the future of the region, i.e. what are appropriate forms of development, how can agriculture be modernised without eliminating traditional culture, what is worth preserving, and what are the key assets of nature and culture in the region. One salient aspect of this is question of what constitutes attractive landscapes.

The study utilised a representative sample of the adult population (above 15 years of age). Respondents were first recruited by phone. A data collection agency contacted a random representative sample of approximately 50% men and women according to the national register of residents (if a person declined the sampling continued until a net sample of 700 was reached). Each potential respondent was given an introduction to the project and asked if he or she would complete a mail questionnaire later. Two reminders resulted in 501 usable questionnaires giving a response rate of 71.6%. The questionnaire contained questions about attachment and experience with the area, recreational use, landscape perception and evaluation, attitudes toward management and protection of resources, environmental beliefs, and orientation towards modernity issues, as well as background characteristics of the respondents.

2.2. Survey instruments and analysis

The respondents were asked to indicate landscape preferences through rating a series of 24 colour photographs on a seven point scale ranging from 'Do not like at all' to 'Like very much', according to how attractive they found each image. The photographs were provided on a separate sheet allowing larger formats of the pictures and also high quality reproduction. The pictures were selected with the aim of representing a more or less representative cross-section of landscapes in the municipality that could be defined as an agricultural landscape. Three people, the senior author and two other researchers who knows the area in depth, selected the final 24 landscape images out of a larger pool of pictures. As an expert process, a certain perspective and limitation is placed on the representativeness of the

Table 1
Socio-demographic characteristics of the respondents (in percent)

Gender	Age (year)		Education (years completed)		
Male	50.4	15–24	4.5	Primary school (1–9)	17.3
Female	49.6	25–39	24.9	Secondary (10–12)	41.5
		40–54	36.9	University/college (13 or more)	40.1
		55–69	23.7		
		70 and above	10.0		

images included. We might indeed have ended up with a different portfolio, had a group of residents been asked to select the pictures out of a larger sample. However, we attempted to achieve a reasonable geographic and thematic representation by including a range of places, activities, and human impacts that we through personal experience and previous studies from the area knew were important. We also sought to secure reliability in the perception and measurement process by selecting pictures with roughly the same weather and light conditions. To some degree, we also selected pictures according to composition by avoiding pictures with very dominating details in the foreground that would deter attraction away from the overall landscape. Finally, we chose pictures which give a similar impression in types of colours and seasons, that is pictures from approximately mid-summer. Since past and present agricultural practices are quite diverse, this included a range of landscapes from those characterised by modern, and intensive agriculture dependent on heavy machinery to less modified landscapes such as grazing areas, meadows, summer farms and other types of buildings, and fairly pristine wildland areas.

Environmental value orientations were measured using a scale measuring the degrees of anthropocentric and ecocentric orientation among the respondents. We included 25 items from a scale originally developed by Thompson and Barton (1994). The scale contains items that constitute three subscales; ecocentrism, anthropocentrism, and environmental apathy. Eight out of the 33 items in the original scale were omitted since an identical 25 item scale gave reliable results in an earlier study in Norway (Bjerke and Kaltenborn, 1999), and due to constraints on space in the questionnaire.

Landscape preferences were analysed by first ranking the pictures according to mean scores. Exploratory

factor analysis with principal components extraction and varimax rotation was then used to identify key dimensions or categories of landscape images. Reliability analysis was performed for the environmental value orientation subscales and for the landscape preference dimensions. Environmental value orientations were analysed by calculating sum scores for each of the three subscales. Relationships between landscape preferences and environmental value orientations were examined through bivariate correlations and multiple regressions. Interaction effects of socio-demographic variables on the relationships between landscape preferences and environmental value orientations were examined through multiple regressions. Interaction items/variables are computed by multiplying environmental value orientations subscale scores with age, gender, and education. Interaction items are then entered stepwise as independent variables in the regressions along with the demographic and environmental value orientation variables. The sample is evenly distributed between men and women, as well as different age groups. It is also a fairly well educated group of people (Table 1). Landscape preference dimensions saved as factor scores are treated as the dependent variables in this analysis.

3. Results

3.1. Landscape preferences and environmental value orientations

The respondents' perception on attractiveness, i.e. how well do they like each of the pictures, are shown in Table 2. The pictures presented in the survey elicit diverse responses with a range of 1.6 units on the five point scale. The mean ratings of the entire sample show that the most attractive scenes include pristine

Table 2
Mean scores for landscape preferences^a

Picture no.	Picture content	Mean	S.D.	N
1	Tourist lodge, log building	3.6	0.96	479
2	Old clear-cut, partly grown over	3.7	1.0	478
3	Farm buildings, barn and living quarters	3.5	0.97	476
4	Pristine wildlands, forest and lake	4.5	0.65	475
5	Farm field and gravel road aligned with birch trees	4.1	0.93	479
6	Old farmstead, log buildings and meadow	3.9	0.96	480
7	Camp with tent by lakeside	4.0	1.0	478
8	Pristine lakeside and pine forest	4.4	0.84	476
9	Modern agricultural field and farm buildings, silo	2.1	1.0	471
10	Farm landscape, newly cut field, traditional farm buildings, mountains in background	3.4	1.0	477
11	Farm fields, road, fences, mountains in background	3.3	1.0	474
12	Cattle grazing in birch forest	4.2	0.91	477
13	Log cabin in dense forest	4.0	1.0	481
14	Farms field bounded by stone fences	3.6	1.0	477
15	Newly cleared farm field and trench to drain water	2.4	1.1	474
16	Grass meadow and dilapidated building	2.9	1.2	478
17	Grass meadow in birch forest	3.7	0.9	479
18	Summer farm, log buildings, mountains in the background	4.4	0.7	479
19	Reconstructed log flume	3.9	1.0	478
20	Pitfall	4.1	0.9	475
21	Soil mound and trench (traditional way of creating a natural fence)	3.1	1.1	476
22	Angler in wilderness type setting	4.4	0.8	478
23	Open farm field, modern agriculture, row of pine trees in the background	2.9	1.1	474
24	The town of Røros with farm fields in the background	4.3	0.8	474

^a Attractiveness, single pictures: 1, do not like at all; 5, like very much.

wildland type settings with forest and lake elements. However, pictures displaying traditional human activities are also perceived as fairly attractive. Examples of this are images of old summer farms in the mountains, pit-falls (human created pits to trap animals), a reconstructed log flume, and log cabins in the woods. Interestingly, the town of Røros with farmland in the foreground receives a high positive score. An iconised image to the respondents, this picture with the well-known church in the centre may well represent a symbolic marker of place identity.

The least attractive images include scenes, which portray more modern forms of agriculture. Newly cleared land, flat and open farm fields, modern buildings such as a silo tower, as well as buildings in state of decay are seen as less attractive or unattractive. Thus, there appears to be a time dimension related to attractiveness as well as the degree of human created environmental change. Old cultural landscapes are seen as more attractive than recent agricultural land, even though the first also represents a high degree of human modification of the landscape.

Exploratory factor analysis of the landscape ratings revealed that the images can be grouped into four main dimensions (Table 3). Only items with factor loadings above 0.5 were retained in the final analyses. A four-factor solution with 20 items proved to give the best solution. Thus, 4 out of the 24 items were omitted since they did not distinctly belong to one or the other of the key dimensions of landscape preferences. The internal validity of the four factors or subscales was tested through reliability analysis. Alpha values for the scales ranged from 0.75 to 0.80 (Table 3).

These four landscape preference dimensions are labelled: 'modern agriculture', 'farm environment', 'wildlands', and 'cultural landscape'. In total, the four dimensions explain 57.2% of the variance. The first factor is the dominant one, explaining about one-third of the variance in the data.

The items of the ecocentrism–anthropocentrism scale with the respective scores are shown in Table 4. The mean scores range from 1.8 to 6.2 on the seven point scale. The average scores for the ecocentrism, anthropocentrism, and environmental apathy subscales

Table 3
Landscape preferences dimensions (principal components, rotated factor solutions and reliability analysis^a)

Factor	Eigen values	Pictures no.	Factor scores	Picture variance	Cum variance	Alpha for scale
Modern agriculture	6.43	9	0.53	32.2	32.2	0.78
		15	0.77			
		16	0.59			
		21	0.73			
		23	0.69			
Farm environment	2.37	1	0.61	11.8	44.0	0.80
		3	0.67			
		10	0.77			
		11	0.60			
		12	0.62			
Wildlands	1.43	4	0.67	7.2	51.2	0.77
		7	0.74			
		8	0.76			
		20	0.56			
		22	0.79			
Cultural landscape	1.2	5	0.66	6.0	57.2	0.75
		6	0.67			
		17	0.66			
		18	0.61			
		19	0.56			

^a $N = 457-475$.

are also shown. The reliability of the three subscales was acceptable with alpha values of 0.72 (ecocentrism), 0.75 (anthropocentrism), and 0.72 (environmental apathy). The environmental attitude subscales are partly interrelated. Ecocentrism correlates with anthropocentrism ($r = 0.27$, $P < 0.01$), and environmental apathy ($r = -0.15$, $P < 0.01$). Anthropocentrism correlates with environmental apathy ($r = 0.42$, $P < 0.01$) (Table 5).

3.2. Relationships between landscape preferences and environmental value orientations

Environmental value orientations are related to landscape preferences in different ways (Table 5). The cultural landscape factor correlates significantly with the ecocentrism ($r = 0.15$, $P < 0.01$), and environmental apathy ($r = -0.11$, $P < 0.05$) subscales. The wildland factor correlates significantly with the ecocentrism ($r = 0.34$, $P < 0.01$) and environmental apathy ($r = -0.15$, $P < 0.01$) subscales. The 'farm environment' dimension correlates with the anthropocentrism subscale ($r = 0.18$, $P < 0.01$). No significant correlations were found between the 'modern agricul-

ture' dimension and any of the environmental attitude subscales (Table 5). This is somewhat surprising, since one might expect an association between anthropocentric attitudes and modern agricultural practises. However, this could be an artefact of the analysis. A test of separate correlations between the four pictures in the 'modern agriculture factor' and the three environmental attitude scale reveal that ecocentrism correlates positively with two pictures (no. 16; grass meadow and dilapidated building, $r = 0.14$; $P < 0.01$, and no. 21, soil mound and trench, $r = 0.15$, $P < 0.01$). Anthropocentrism correlates positively with another two pictures (no. 15 newly cleared farm field and trench to drain water, $r = 0.14$, $P < 0.01$; and no. 23 open farm field, modern agriculture, $r = 0.10$, $P < 0.05$). Environmental apathy correlates positively with two pictures (no. 9, modern agricultural field and farm buildings, silo, $r = 0.11$, $P < 0.05$; and no. 15, newly cleared farm field and trench to drain water, $r = -0.09$, $P < 0.05$) (see Table 2 for picture contents). So even though the 'modern agriculture' factors exhibits satisfactory reliability (alpha for scale 0.78), there seems to be some conceptual diversity linked to the agricultural practices presented that

Table 4

Mean scores for single items of ecocentrism (ECO), anthropocentrism (ANTHR), and environmental apathy (APATH) scales^a

	Subscale	Mean	S.D.	N
One of the worst things about overpopulation is that natural areas are getting destroyed for development	ECO	4.9	1.7	483
I can enjoy spending time in natural settings just for the sake of being out in nature	ECO	5.6	1.5	483
The worst thing about the loss of the rain forest is that it will restrict the development of new medicines	ANTHR	3.5	2.0	477
Sometimes it makes me sad to see forests cleared for agriculture	ECO	4.0	1.8	483
It seems to me that most conservationists are pessimistic and somewhat paranoid	APATH	3.7	1.8	486
I prefer wildlife reserves to zoos	ECO	5.9	1.4	487
The best about camping is that it is a cheap vacation	ANTHR	3.4	1.7	479
I find it hard to get too concerned about environmental issues	APATH	3.7	1.7	489
I need time in nature to be happy	ECO	5.5	1.5	489
The thing that concerns me about deforestation is that there will not be enough lumber for future generations	ANTHR	3.1	1.7	483
Sometimes when I am unhappy I find comfort in nature	ECO	5.4	1.6	488
I do not care about environmental problems	APATH	2.3	1.6	485
One of the most important reasons to keep rivers and lakes clean is so that people can have a place to enjoy water sports	ANTHR	1.8	2.0	480
I am opposed to programs to preserve wilderness, reduce pollution and conserve resources	APATH	2.0	1.7	478
It makes me sad to see natural environments destroyed	ECO	6.1	1.4	487
The most important reason for conservation is human survival	ANTHR	4.6	1.9	480
One of the best things about recycling is that it saves money				
Nature is important because of what it can contribute to the pleasure and welfare of humans	ANTHR	3.0	2.5	484
Too much emphasis has been placed on conservation	ANTHR	4.7	1.9	477
We need to preserve resources to maintain a high quality of life	APATH	2.8	1.8	485
Being out in nature is a great stress reducer for me	ANTHR	5.2	1.7	485
One of the most important reasons to conserve is to ensure a continued high standard of living	ECO	6.2	1.1	488
One of the most important reasons to conserve is to preserve wild areas	ANTHR	3.2	1.9	479
Continued land development is a good idea as long as a high quality of life can be preserved	ECO	5.1	1.5	483
Sometimes animals seem almost human to me	ANTHR	3.8	1.6	478
Ecocentric subscale—average item	ECO	4.2	2.0	478
Anthropocentric subscale—average item		5.3		
Environmental apathy subscale		3.6		
		2.9		

^a After Thompson and Barton (1994) (1, completely disagree; 7, absolutely agree).

make the relationship with environmental attitudes less distinct.

Multiple regression analysis was used to assess whether socio-demographic conditions have any interaction effects on the relationships between environmental value orientations and landscape preferences. First, four regression models were run including the variables age, gender, education and the sum cores of the three subscales ecocentrism, anthropocentrism, and environmental apathy, as independent variables. In each of the four analyses, one of the key landscape preference dimensions; 'modern agriculture', 'farm environment', 'wildlands', and 'cultural landscape' were entered as the dependent variable. The purpose

of this was to see which of the demographic variables (age, gender, level of education) and environmental attitudes that contributed significantly to the variance in the landscape preferences. Those that did not enter into a significant relationship were omitted from further analysis.

In the subsequent analysis, where the purpose was to identify interaction effects, landscape preference dimension were once more entered as dependent variables one at a time in a total of four models. In each of the runs, those independent variables that had shown to produce significant relationships were entered in three blocks. Environmental attitude scores were entered in the first block, the relevant

Table 5
Correlations between landscape preference dimensions and environmental attitudes^a

	Ecocentrism	Anthropocentrism	Environmental apathy
Ecocentrism	1.00	0.27 ^b	-0.153 ^b
Anthropocentrism	0.27 ^b	1.00	0.417 ^b
Environmental apathy	-0.153 ^b	0.417 ^b	1.00
Modern agriculture	0.13	0.08	0.07
Farm environment	0.09	0.18 ^b	0.04
Wildlands	0.34 ^b	0.06	-0.15 ^b
Cultural landscape	0.15 ^b	-0.06	-0.11 ^c

^a $N = 430-491$.

^b Correlation is significant at the 0.01 level.

^c Correlation is significant at the 0.05 level.

Table 6
Effects of socio-demographic conditions on relationships between landscape preferences and environmental attitudes

Landscape preference dimension	Interaction variable	Model	r^2 change	Significant change
Modern agriculture	Age	1	0.036	0.020
Farm environment	Age, education	1	0.078	0.000
Wildlands	None			N.S.
Cultural landscape	Education	1	0.058	0.000

demographic variables in the second, and the interaction variables in the third block.

The results of this analysis are shown in Table 6. For the landscape preference dimension 'modern agriculture', age produces a significant interaction effect. For the 'farm environment' dimension, age and education produce significant interaction effects. No significant effects of the socio-demographic variables are found for the 'wildlands' dimension. For the 'cultural landscape' dimension, education produces a significant interaction effect.

4. Discussion

4.1. Landscape preferences

The respondents of the present study expressed their strongest positive preference for wildland scenes, all containing a dominating element of water. Next in preference were cultural landscapes and traditional farm environments (older buildings, small road, birch meadow). Landscapes showing the effects of modern agricultural practises (silo, newly cleared, large and open fields) were the least preferred category of

pictures. The preference for views of water confirms findings from several previous studies (Zube et al., 1982; Herzog, 1985; Burmil et al., 1999). That wildland scenes without human-made, permanent structures are highly appreciated is also consistent with many previous studies (Ulrich, 1993). However, in a study of visual preferences among students for agrarian landscapes in the western coastal area of Norway, Strumse (1994) found that the category named Old Structures (old buildings, stone walls and bridges) received the highest preference score. As in the present study, modern farming elements (silo, machines) were the least preferred in Strumse (1994) study. Of course, it can be quite difficult to sort out what factors actually influence preferences and choices. For instance, it is well known that water is among the most attractive landscape elements to be found. It is quite possible that the wildland scenes included here might have elicited lower ratings had they not contained water. Ideally, this should have been explored in more depth. On the other hand, it is worth noting that the wildland scenes included here are highly typical of the study area. This particular environment is largely characterised by the intermingling of pine forest and lakes and streams. In the minds of the respondents, it

would probably be unusual to think of a local wildland scene without water. So at least the scenes represent a well known local context, although that methodologically does not fully answer the question of what is actually being measured.

4.2. *Environmental value orientations*

Thompson and Barton (1994) found no association between ecocentric and anthropocentric subscale scores in their study among students, or among persons waiting at an airport. In the two additional studies where this scale has been used, a significant positive correlation between the two subscales has been found. Schultz and Zelezny (1999) found positive correlations (ranging from 0.16 to 0.43) in eight samples of students from Latin American countries, but such associations were not found among students from the USA, Canada, and Spain. Bjerke and Kaltenborn (1999) found a positive correlation between ecocentrism and anthropocentrism among sheep farmers in Norway, but not among biologists and environmental managers. Obviously, many groups dislike the destruction of natural areas and enjoy spending time in nature (ecocentric statements) in combination with the endorsement of an anthropocentric value orientation. In such cases, ecocentric and anthropocentric value orientations may be positioned at each end of one continuum, with a mixture of the two orientations occurring at the midpoint. In addition, a positive correlation was found in the present study between an anthropocentric value orientation and apathy about environmental issues. Such an association was also reported by Thompson and Barton (1994) in the sample interviewed at an airport.

4.3. *Environmental value orientations and landscape preferences*

The main objective of the present study was to search for relationships between environmental value orientations and landscape preferences. The results show that significant and positive correlations exist between ecocentrism and a preference for wildlands with water, and for cultural landscapes. In addition, an anthropocentric value orientation correlates positively with a preference for farm environments, while environmental apathy is negatively associated with a

preference for wildlands and cultural landscapes. A literature review did not identify relevant empirical studies of landscape preferences that has used environmental value orientations scales. There are studies, however, showing that individuals who have joined an environmental lobby group (Sierra Club) show a higher preference than members of the general public for wilderness-type landscapes (Dearden, 1984). And in the debate about management of natural resources in general, conflicts between preservation-oriented environmentalists and persons with more utilitarian and anthropocentric values are common. Persons who argue for the preservation of wildlands often hold that animal species and ecosystems deserve consideration in their own right, thus, satisfying the criteria for the designation ecocentrism. For example, studies of attitudes toward animals have revealed positive associations between anthropocentrism and negative attitudes toward carnivores, and between ecocentrism and positive attitudes toward this group of species (Bjerke and Kaltenborn, 1999). Thus, a positive association between a preference for wildlands and an ecocentric value orientation was to be expected. Likewise, a positive association between anthropocentrism and preferences for farm landscapes may reflect the utilitarian and instrumental aspects of an anthropocentric value orientation. It is somewhat surprising that a preference for modern agricultural landscapes did not correlate positively with either environmental value orientation, but as discussed earlier this could be a weakness of the method applied.

4.4. *Implications*

The results of the present study have some implications for the future management of the landscapes in the region. We believe several stakeholders can make use of this type of information. Decision makers in both the environmental- and agricultural sectors need to be better informed about the landscape preferences and attitudes toward the environment among various user groups. Public managers and planners at different levels work with policy questions involving these types of issues. To some extent, the results of this study can be relevant at the national level, but it may be particularly useful on the municipal- and county-levels, where local land use plans are created. Local land owners, and particularly

active farmers trying to adjust their practices to the increasingly difficult economic conditions, may find these results interesting as a source of information about what is considered valuable landscapes among the residents of the region. This may be one piece of information that can help reduce conflicts over land use changes. Furthermore, the local tourism industry can use this type of information for marketing purposes, i.e. what are attractive elements of the destination. Tour operators can also use it for packaging experiences so that visitors get a suitable composition of cultural and natural environment elements in their trips.

The landscape preferences expressed by this representative sample of inhabitants indicate that caution should be exercised against plans to change wilderness areas with lakes and rivers. In addition, old traditional farm-houses, other log buildings, small roads aligned with trees, grazing animals, and the town of Røros are highly appreciated elements. Second, the public in average agree to ecocentric statements, while they neither agreed nor disagreed to the anthropocentric items. This result indicates that the majority of the people living in the area should be responsive to ecocentric arguments when development or conservation plans are being presented. And if one wishes to stimulate environmental concern, ecocentric arguments should be more effective than anthropocentric arguments, since the latter often are associated with environmental apathy.

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